



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/740,826

12/21/2000

Ari Heikkinen

397.39397X00

6582

20457

7590

07/07/2004

EXAMINER

HARPER, V PAUL

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-9889

ART UNIT

PAPER NUMBER

2654

16

DATE MAILED: 07/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/740,826

Applicant(s)

HEIKKINEN ET AL.

Examiner

V. Paul Harper

Art Unit

2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2004 and 19 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-14 and 29-42 is/are allowed.
- 6) ☒ Claim(s) 15-28 is/are rejected.
- 7) ☐ Claim(s) 27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Applicant is advised that should claims 25 and 27 be found allowable, claim 27 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 15-17 and 22-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Swaminathan et al. (U.S. Patent 5,734,789), hereinafter referred to as Swaminathan.

Regarding claims 15 and 22, Swaminathan discloses a method for determining voiced and unvoiced modes in a vocoder. Swaminathan's method includes the following steps: **"dividing a speech signal segment into sub-segments"** (Figs. 15

and 17, col. 9, lines 9-30); **“determining a value relating to the voicing of respective speech signal sub-segments”** (col. 8, lines 20-25); **“comparing said values with a predetermined threshold”** (Fig. 15, items 15018 et seq., Fig. 17, items 17030 et seq.); **“classifying the speech segment as voiced if a certain number of the values corresponding to at least one sub-segment of the segment is on one side of the threshold”** (Fig. 15, item 15035, Fig. 17, item 17050).

Regarding claims 16 and 23, Swaminathan teaches everything claimed, as applied above (see claims 15 and 22, respectively). In addition, Swaminathan teaches, **“making a decision is based on whether the value relating to the voicing of the last sub-segment is on the one side of the threshold”** (Fig. 15, item 15032, and Fig. 17, item 17022, where the last sub-frame value is used in the decision; and the description of the delayed decision approach where the decision is made after the last sub-frame, col. 11, lines 5-56, in particular, lines 45-50).

Regarding claims 17 and 24, Swaminathan teaches everything claimed, as applied above (see claims 15 and 22, respectively). In addition, Swaminathan teaches, **“making a decision is based on whether the values relating to the voicing of last K_{tr} sub-segments are on the one side of the threshold”** (Fig. 15, item 15032 and preceding, and Fig. 17, item 17022 and preceding, where the last sub-frames values are used in the decision; and col. 16, lines 1-15 as argued above).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 18-21 and 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Swaminathan in view of Hess ("Pitch and voicing determination," in *Advances in Speech Signal Processing*, S. Furui et al. (eds), 1992) and further in view of Rabiner et al. ("Digital Processing of Speech Signals," Prentice-Hall, Inc, 1978), hereinafter referred to as Rabiner.

Regarding claims 18, 25, 27 and 28, Swaminathan teaches everything claimed, as applied above (see claims 15, 22, 22 and 23, respectively). In addition, Swaminathan teaches testing the counter's final value against a fixed threshold (col. 9, lines, 24-25), but Swaminathan does not specifically teach **"making a decision is based on whether the values relating to the voicing of substantially half of the sub-segments of the speech signal segment are on the one side of the threshold."** However, the examiner contends that this concept was well known in the art, as taught by Hess.

In the same field of endeavor, Hess teaches techniques for voicing determination where adjacent frames are checked and the decision is made using a medial smoother (i.e., the middle value setting the threshold to substantially half of the sub-segments) (p. 33, §2.1, ¶1, in particular the last two sentences).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Swaminathan by specifically providing the decision technique, as taught by Hess, since this was a well-known technique used to filter out large errors (Rabiner, p. 158, §4.9, in particular ¶1, p. 162, last sentence of ¶1).

Regarding claims 19 and 26, Swaminathan in view of Hess teach everything claimed, as applied above (see claims 15 and 22, respectively). But Swaminathan does not specifically teach **“value related to voicing of respective speech signal sub-segments comprises an autocorrelation value.”** However, the examiner contends that this concept was well known in the art, as taught by Hess.

In the same field of endeavor, Hess teaches pitch and voice determination where an autocorrelation can be performed to determine pitch (§1.3, starting on p. 11) and the pitch can be used to determine voicing (p. 33, §2.1, ¶1).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Swaminathan by specifically providing the autocorrelation technique, as taught by Hess, since it was well-known that this technique could be applied to accurately determine voicing (§1.3.2, ¶1).

Regarding claim 20, Swaminathan in view of Hess teach everything claimed, as applied above (see claim 19). But Swaminathan does not specifically teach **“the estimated pitch period is determined based on said autocorrelation value”**. However, the examiner contends that this concept was well known in the art, as taught by Hess.

Hess further teaches the use of autocorrelation to determine pitch period (lag) (p. 12, §1.3.2).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Swaminathan in view of Hess by specifically using the autocorrelation technique to calculate pitch period, as taught by Hess, since the use of autocorrelation was well-known and a standard technique for determining pitch period (§1.3.2, ¶1).

Regarding claim 21, Swaminathan teaches everything claimed, as applied above (see claim 15). In addition, Swaminathan teaches the classification of each signal into one of three modes (abstract, col. 6, lines 35-45, voiced, unvoiced and background noise), but Swaminathan does not specifically teach **“the determining the voicing of a speech signal segment comprises a voiced/unvoiced decision.”** However, the examiner contends that this concept was well known in the art, as taught by Hess.

In the same field of endeavor, Hess teaches techniques for making voicing decisions (i.e. voiced/unvoiced) (p. 32, §2).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Swaminathan by specifically providing a voice/unvoiced decision, as taught by Hess, since it was well-known that such a determination is useful in voice source analysis (Hess, p. 3, ¶1).

Reasons for Allowance

4. Claims 1-14 and 29-42 are allowed.

After further search and consideration, it is noted that the closest prior art of record, Swaminathan et al. (US Patent 5,734,789), teaches the differential processing of sub-frames (col. 16, lines 5-15), but Swaminathan et al. does not teach that the voicing decision is made with emphasis on at least one last sub-segment of the segment as taught by the applicant. Thus, independent claims 1, 8, 29 and 36 are allowable over the prior art of record because the cited prior art alone or in combination, does not fairly suggest or disclose the claimed combination of features.

Response to Arguments

5. Applicants assert on page 14:

Independent claims 15 and 22 recite classifying the speech segment as voiced if a certain number of the values corresponding to at least one sub-segment of the segment is on one side of the threshold. In Section 4 of the Final Rejection, the Examiner alludes to Hess teaching techniques for voicing determination where adjacent frames are checked and the decision is made using a medial smoother. However, it is submitted that page 33, Section 2.1, paragraph 1, of Hess does not suggest to a person of ordinary skill in the art the aforementioned subject matter recited in independent claims 15 and 22. Moreover, in the discussion of Swaminathan, the Examiner acknowledges that Swaminathan does not make a decision "based on whether the values relating to voicing of substantially half of the sub-segments of the speech signal segment are on the one side of the threshold". Hess's reference to a medial smoother would not be understood by a person of ordinary skill in the art to cure this deficiency. Accordingly, it is submitted that the subject matter of claims 15 and 22 are patentable. Moreover, dependent claims 16-21 and 23-28 define more specific aspects of the present invention which are not rendered obvious by the proposed combination of Hess and Swaminathan.

Art Unit: 2654

The reference to Rabiner has been added as motivation for using the technique for medial smoothing (p. 158, §4.9 "Median Smoothing and Speech Processing"). The Rabiner reference is a standard speech processing book published in 1978, and the cited material specifically teaches the use of the medial smoothing technique during transitions between voiced and unvoiced speech. Thus the examiner maintains that knowledge of these techniques would have been well known by a person of ordinary skill in the art at the time of the invention.

The remaining arguments are moot either in view of the new art or in view of the allowable subject matter.

Conclusion

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(703) 872-9314

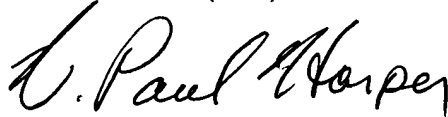
Hand-delivered responses should be brought to:

Crystal Park II
2121 Crystal Drive
Arlington, VA.
Sixth Floor (Receptionist)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. V. Paul Harper whose telephone number is (703) 305-4197. The examiner can normally be reached on Monday through Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-9645. The fax phone number for the Technology Center 2600 is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service office whose telephone number is (703) 306-0377.



VPH/vph
June 22, 2004



RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER